Joint Medical Distance Support and Evacuation – Joint Combat Casualty Care System Concept of Employment

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ABSTRACT

The United States Joint Forces Command (USJFCOM) is conducting the Joint Medical Distance Support and Evacuation (JMDSE), Joint Capability Technology Demonstration (JCTD) to enable military precision logistical delivery of critical, mission specific combat casualty care support packages to include telemedicine, enhanced digital patient encounter documentation capture, and transmission capabilities for medical first responders. Dubbed, the Joint Combat Casualty Care System (JCCCS), these enhanced capabilities will be air-dropped by a lightweight version of the Joint Precision Airdrop System (JPADS) from manned and/or Unmanned Aerial Systems (UAS) to augment and extend in-place combat casualty care within forward Army, Marine Corps and Special Operations ground forces, Air Force Para-rescue teams, and Navy ships that have limited organic medical support. Within these combatant organizations, medics or corpsmen will be provided an on-demand capability to capture and transmit digital physiological monitoring data (i.e. blood pressure, pulse, temperature, respirations, ECG, ECO2, SP02, ventilator treatment, intracranial bleeding data and other elements common to the Tactical Combat Casualty Care and Field Medical Cards) and digital voice recordings of patient encounters to enable immediate telementoring and to facilitate incorporation of more accurate and more complete point-of-injury data within the patient's permanent medical record. A set of ruggedized combat casualty care equipment and a lightweight digitally enabled physiological monitoring system are being integrated with military radios and soldier headset voice data capture technologies, and will be packaged for just-in-time air delivery via JPADS. The amount and type of support will vary by mission and unit needs. A series of three 2010-11 Operational Demonstrations involving six operational scenarios involving land, air and maritime forces will be used to determine the utility of JMDSE capabilities. We discuss the technologies employed, the operational scenarios and results of the first series of exercises.

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1.0 INTRODUCTION

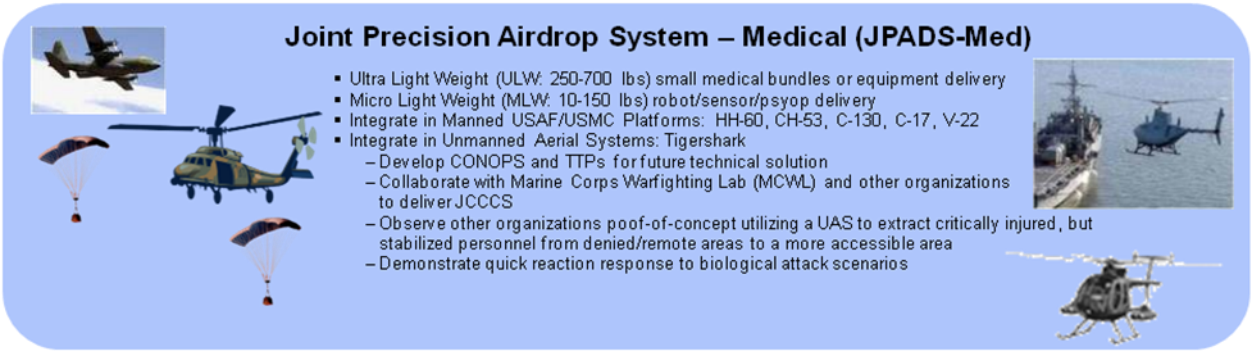
United States Joint Forces Command (USJFCOM) introduced the Joint Medical Distance Support and Evacuation (JMDSE), Joint Capability Technology Demonstration (JCTD) to address the military need for a combat casualty support capability to significantly enhance battlefield medicine, provide precision logistical delivery and be a force multiplier for casualty evacuation (CASEVAC) assets. The Joint Combat Casualty Care System (JCCCS) portion of the JMDSE JCTD is to provide a more robust medical support capability that is required to support operations on non-contiguous and dispersed battlefields than is currently available at Role 1. JCCCS is in effect, a US Joint service implementation and a Role 1 extension of NATO STANAG 2517 MED – Development and Implementation of Teleconsultation Systems.

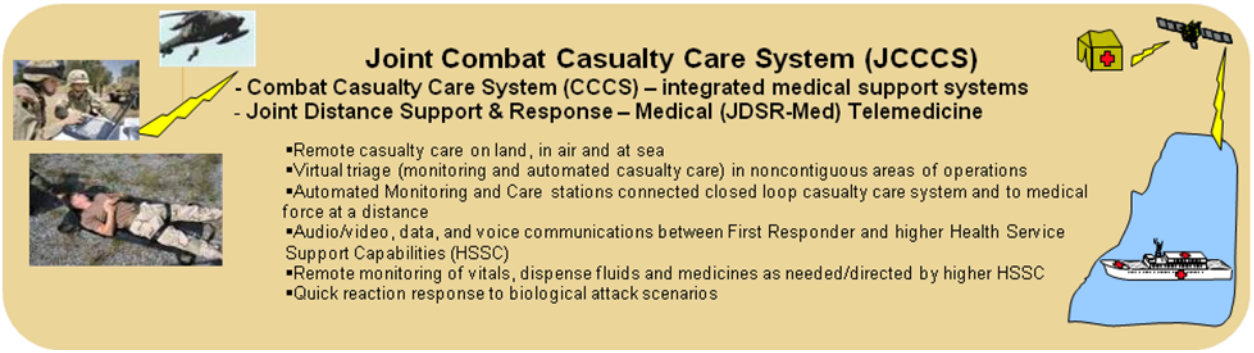
A more robust medical support capability is required to support operations on non-contiguous and dispersed battlefields then is currently available for the following reasons: 1) Casualty care/evacuation assets are low density high demand; 2) Non-contiguous battlefields with widely dispersed forces create more demand; 3) Severity of injuries critical care within the "golden hour"; 4) Dispersed forces operating far from the main body extend support requirements over distance and time, creating inordinate stress on the lines of communication; and 5) CASEVAC assets need greater protection in uncontrolled and denied areas.

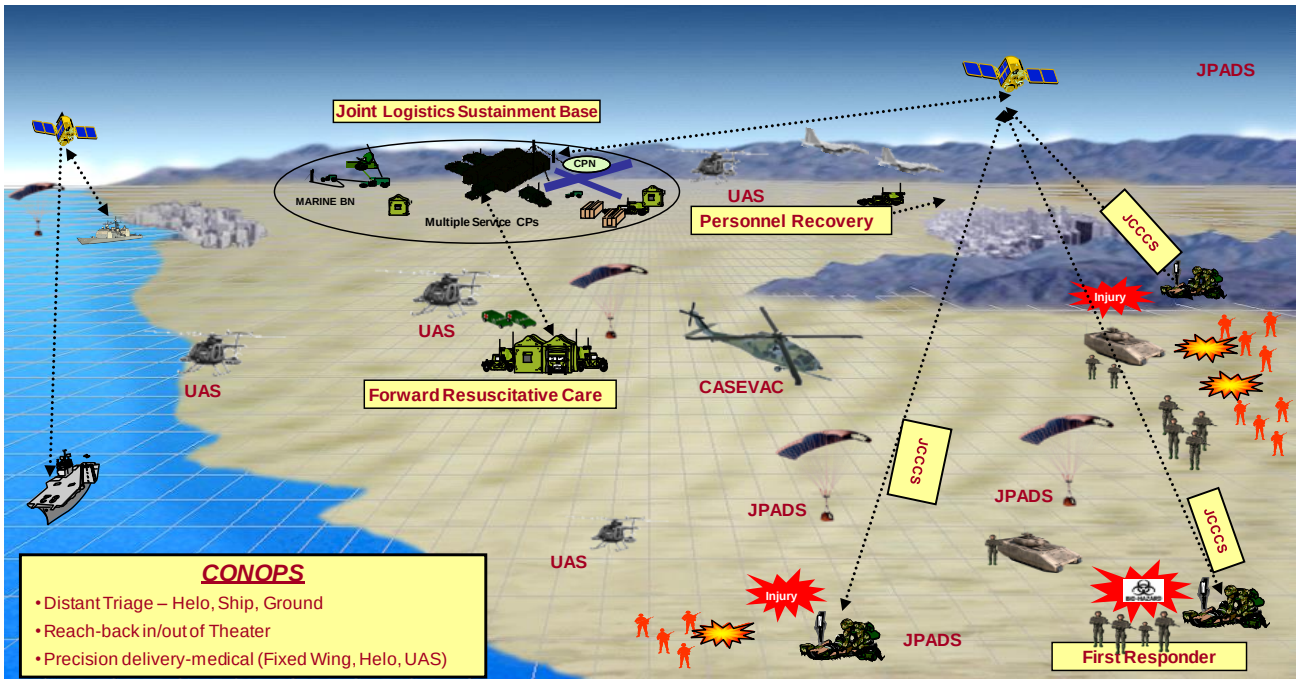
Establishment of this high degree of casualty support requires a force multiplier effect through the use of advanced technology to integrate battlefield telemedicine, medical resupply and CASEVAC where needed: 1) Current communications and telemedicine technology may be adapted and integrated for battlefield tele-monitoring support to provide virtual reach-back, patient monitoring and provide directed critical care on the battlefield; 2) Current aerial precision delivery capability may be adapted to provide rapid precision delivery of small medical bundles and equipment to dispersed ground and maritime forces from variety of rotary and fixed wing aircraft platforms; and 3) Current unmanned aerial systems (UAS) may be adapted to provide rapid precision delivery of small medical bundles and equipment and proof-of-concept casualty extraction from "denied" or remote areas.

2.0 RATIONALE

In proposing this JCTD, the USJFCOM stated that the Joint Force Health Protection (JFHP) needs the capability to operate as a more fully integrated system with self-synchronization of medical care and rapid/precise delivery of medical supplies and equipment. At the present time JFHP does not have the rapid, joint, self-managed and scalable response capabilities required to overcome these gaps (JROC, 14 August 2007). While the main focus of the JMDSE JCTD is on just-in-time delivery of augmented medical combat care capabilities and supplies via the Joint Precision Airdrop System (JPADS), JCCCS will augment Role 1 with additional care, monitoring and telementoring support at the point of injury/illness (POI) and the amount and type of support will vary with by mission and unit needs. The U.S. Department of Defense medical forces must transform into a more agile, capable, versatile, survivable, sustainable and rapidly deployable forces. The medical community must develop new approaches to sustain forces in denied environments by exploring the delivery of enhanced medical equipment and supplies via light weight precision parachutes and the joint communities' use of long-range unmanned systems for future medical decisions in combat casualty care.





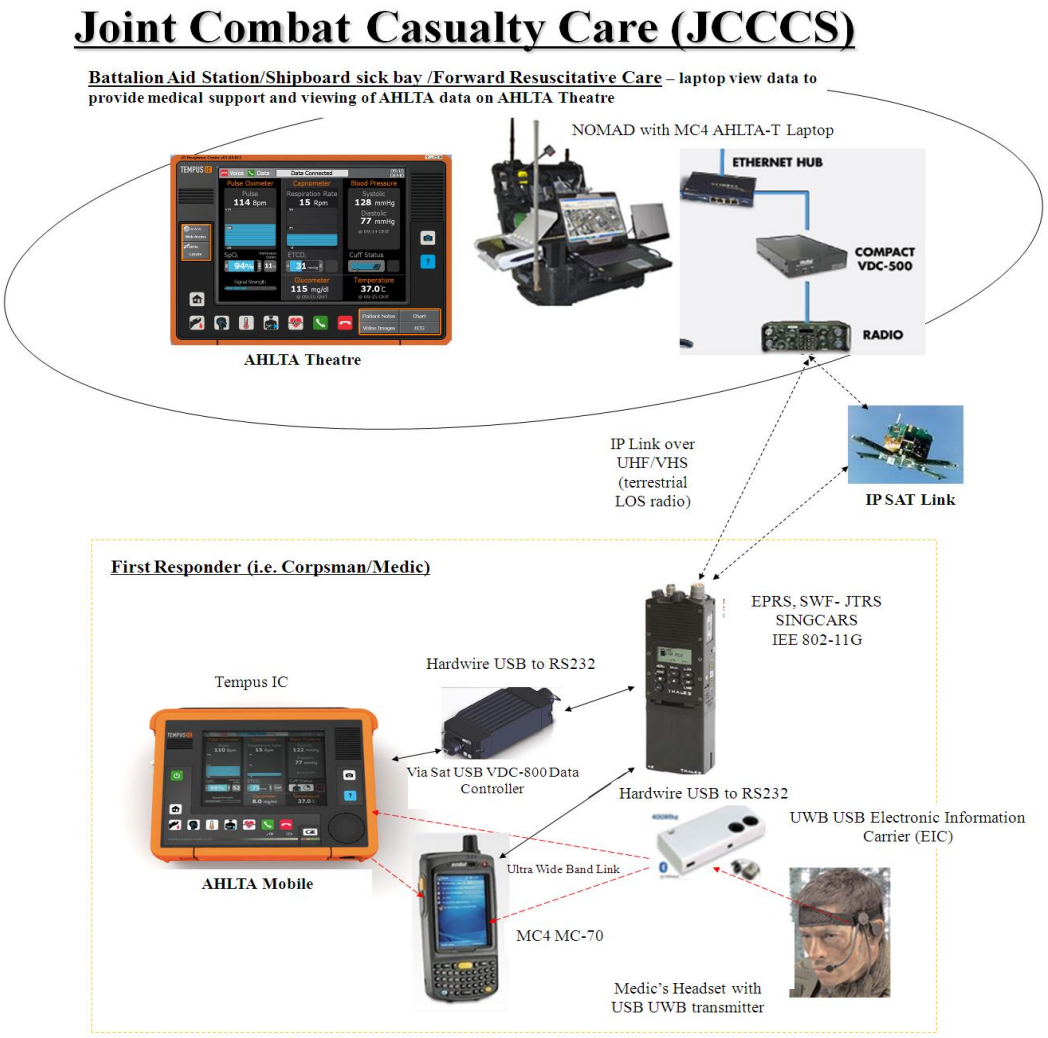


3.0 METHODS EMPLOYED AND RESULTS OBTAINED

A series of three (3) Operational Demonstrations in FY10 and FY11 are planned to coincide with Operational Exercises to specifically determine the utility of the JMDSE system's ability to support distant casualty

monitoring, care and reach-back between Role 1 corpsmen/medics, CASEVAC elements, and Roles 2 and 3 support. The JCCCS devices will be demonstrated in six scenarios to include a ground force maneuver event, maritime events, a SOF event, chemical and/or biological incident events, and a USAF para-rescue event. JCCCS capability will be employed via Joint Precision Aerial Delivery System (JPADS-Med) and/or Unmanned Aerial Systems (UAS) when casualty extraction is not possible for 3 to 72 hours. The first Operational Demonstration scheduled for April 2010 will be conducted within established parameters to provide initial feedback for the planning of the next two demonstrations.

The proposed JCCCS system architecture will utilize the Ultra Wide Band (UWB) wireless Electronic Information Carrier (EIC) which is intended to provide a fast convenient personal repository that will hold all pertinent medical data. The Tempus IC will provide a single compact unit to quickly access and capture critical vital signs and other medical information. This will replace several pieces of equipment currently being used and also serve as a hub for interoperability of the aforementioned technologies. Tempus IC will store healthcare and patient medical condition information at the point of injury. AHLTA-M is the current program of record and has been implemented on the MC-70 handheld computer at Level 1. JCCCS will provide a system of technology that augments AHLTA-M and AHLTA-T processes but does not interfere with standard DHIMS, TMIP or service TMIP (e.g. MC4) operating procedures. In addition to or in lieu of the AHLTA-M medical record, the JMDSE JCTD will demonstrate a digital Trauma Combat Casualty Care (TCCC) Card on the MC-70 handheld computer. A voice recorder capability will be implemented on the MC-70 that includes voice recognition software that will enable the first responder medic to record patient encounters orally. The voice recognition software will, at a minimum, provide start-stop functions for voice recording and enable key word input of voice data (e.g. blood pressure, temperature, SPO2, etc) whenever the medic responder chooses to include that type of data in the patient encounter voice recording. Transcription of data recorded during patient first encounters can be completed via the MC-70 TCCC on the spot, at some later time, or at the next level of care by playing back the voice recording. The first encounter voice recording will be captured and stored on the patient's EIC via a UWB wireless interface to the MC-70 Computer. Likewise physiological data captured on the Tempus IC device will be stored on the patient's EIC as well as being transmitted from site of injury to Role 1 MTF via tactical radios (ANPRC 152 or 148) using EPLRS or SDWF or via cradle synchronization of the MC-70 at the Role 1 MTF. Similarly the medical record stored on the EIC will be transmitted from Role 1 to Roles 2 or 3 MTFs via the NOMAD INMARSAT transmitter and or other military NIPRNET connectivity for eventual inclusion into the Theater Medical Data Store (not part of the JMDSE JCTD).



4.0 ASSESSMENT

Current medical monitoring and support systems will be adapted and integrated to provide combat casualty care in operational environments. Communications between First Responder and Forward Resuscitative Care will be enabled through data and still images. Medical care and health monitoring stations will be integrated into a closed loop casualty care system to remotely monitor vital signs and medicine as directed by First Responders supported by higher HSSC medical units (FRC facility, Battalion Aide Station (BAS), etc.), when required. JCCCS will also enable medical reach-back, coupling medical experts with forward deployed personnel for effective, far forward consultation, diagnosis and treatment. This will contribute to the efficient management of low density, high demand field medical personnel and tactical evacuation capabilities and provide real-time reach-back from the FR to FRC. JCCCS will consider remote maintenance of medical equipment; apply medical care to most critical casualties while monitoring and caring for others; and facilitate critical medical care to forces in denied or remote areas unreachable by tactical evacuation capabilities in the short term. The capabilities to be assessed are: 1) Integrated medical support systems; 2) Data transmission between FR and higher HSSC and; 3) Quick reaction response to biological attack scenarios.

5.0 CONCLUSION

A successful demonstration using the JCCCS will prove that JMDSE can provide enhanced support and enable telementoring at the POI, as well as enhance the capability to support single and multiple trauma at Role 1 and further enable casualties to be sustained until extraction occurs. JPADS-Med will support ground, maritime and air forces operating independently or dispersed from the main force structure in remote areas, with a precision delivery capability from a variety of fixed and rotary wing manned aircraft and UAS. JMDSE JCTD will determine through the series of Operational Demonstrations whether delivery of JCCCS can be accomplished within 3-72 hours and sustained for extended periods, if needed.